Architectural CONCRETE

Introducing a New Chronicle of Building Adventure

By A. J. BOASE

THE history of man and the story of the development of construction are interwoven in a common fabric of intricate pattern. Sometimes the design has been clear and strong, full of virility. Then again it has become confused, a seemingly hopeless intermingling of conflicting motives. Here and there is found almost machine-like precision as all construction and all design followed closely well defined rules. Individuality was wholly lacking. Following such periods, strong personalities have occasionally become dominant and the whole course of building progress and development has been altered.

Down through the ages on the warp threads of man's social and economic advancement has been woven the woof of construction. Each forward step has lead to appreciation of the possibilities of some material of construction heretofore untried. With the passage of time—in some cases single generations, in others centuries have been required—a craftsmanship has developed.

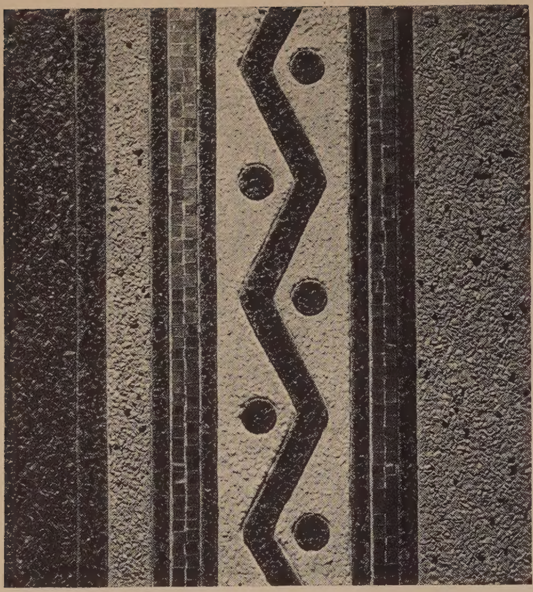
One of man's earliest instincts was to provide himself with shelter. Natural caves sufficed at first, but with man's social development he became more ingenious. Natural materials that lay readily at hand—mud, stones and thatch—were fashioned into crude huts. Later, sun baked bricks and roughly worked timber became the builder's materials.

The advent of a natural cementitious material during the Roman Empire marked an advancement destined to change the whole course of building construction. In the building of the Baths of Caracalla, the Castle of Sant' Angelo, and other contemporary structures, Roman pozzuolana cement combined with aggregates took its place in the construction world as the ancient forerunner of modern concrete.

Through the centuries concrete has been put to an ever widening circle of uses, at first only as a filling material and in large masses. With the invention of portland cement and the introduction of reinforcement, concrete became a true structural material of known strength, adaptable to a multiplicity of uses.

During the past 2,000 years the structural uses of concrete have appeared more and more often in a dominant place side by side with iron and steel, brick and stone. That story has been written in countless volumes. We are now emerging into an era of independent thinking in the arts. There is an indisputable tendency to simplify traditional architectural styles. The function of a building now dictates more and more its appearance. The structural material has become the architectural medium. A technique of design among architects, a craftsmanship among workmen, and a knowledge among engineers of the fundamentals of producing durable concrete have made reinforced concrete an architectural as well as a structural material.

This new chronicle of building adventure the Portland Cement Association proposes to bring to you in the publication ARCHITECTURAL CONCRETE. It is our aim to keep you informed of the development of this interesting part of the history of construction progress. ARCHITECTURAL CONCRETE will be issued every now and then when material is available. There will be special features such as pages of construction details to be retained for future reference; and many interesting articles by men in the building profession will characterize this new publication. We hope you will like it.



In the Department of Justice building the concrete finish—colored aggregate exposed in interesting designs—comprised the forms in which the structural beams and slabs of the ceiling were placed.

Concrete Fulfills a Promise

By JOHN J. EARLEY
Architectural Sculptor

NEARLY all work with architectural concrete has been done in the past twenty years. The material began to attract the attention of architects about ten years ago when it became clear both in the United States and in Europe that it would be developed into an artistic medium and would take a prominent place in architecture. About this time architects began to use the material and afforded to craftsmen the opportunity for practical experience through which the material has been brought to its present state of perfection.

This interesting state of development was then in the hands of relatively few craftsmen, and in general it followed two distinctly separated lines. One group tried to develop concrete as a substitute for natural stone. They thought of it in that way, presented it in that way and in working the material they applied the technique normal to the working of stone. The other group used concrete as a plastic material. They cast it in forms and finished its surface with processes different from those employed to finish stone. They had also begun to introduce color and some work had already been done which was destined to effect far-reaching and important results.

Concrete was being used by some enthusiasts and adventurers whose vision permitted them to see the possibilities of the material, who had faith in it and in its craftsmen, who enjoyed the thrill of new work with a new medium, and who wished to benefit from the economy which is natural to the material and which improvements in technique were beginning to make available. The patronage of these men, adventurers all, afforded the opportunity necessary to the growth of architectural concrete to the state of perfection which I feel it has reached today.

Now, after the past ten years, concrete is no longer in a merely interesting state of development. It has arrived at a state that is thoroughly satisfactory and useful. Its use is no longer the result of enthusiasm or of faith in the skill of a craftsman; but it is the result of experience with the material in a long list of successful jobs. In a word, architectural concrete has "arrived," and I am no longer in the position of one exhorting my colleagues to foster its development for the sake of what it will be, but as one stating and demonstrating conclusively the simple fact that the product is ready for use.

In the field of architecture—by that I mean the field of building construction in which the appearance of the building is of major importance—architectural concrete has only recently realized its early promise. Its use is rapidly spreading but many architects have not yet gained the experience

which will give them confidence in it as a medium for the expression of beauty.

That concrete is beautiful, that it has been approved by the architect and accepted by the public, is the principal thought I wish to leave here. And, together with this must go the assurance that the beautification of concrete has not imposed upon it an economic burden.

To demonstrate this I will not present a narrative of the interesting developments of the past ten years, nor list the accumulation of works done in that time. The evidence I present is in certain work already done, and I direct your attention first to the ceilings of the passages in the United States Department of Justice Building at Washington.

These passages are through the building from the streets to the courts, always exposed to the vicissitudes of weather. The ceilings are reinforced concrete beams and slabs which form the second floor. In designing the building, the architects decided to make a decorative feature of these ceilings, to compose them in unusual patterns, and to execute them in strong color. They considered many types of finishes. Applied pigments were rejected because they did not consider them sufficiently permanent. Other applied finishes, both plastic and solid, were also rejected because, in the architects' minds, the adherence of any separately applied finish was subject to doubt. But when we presented to them the idea of surface treated reinforced concrete of the exposed aggregate type, in which the finish was integral with the structure and the color of known permanence, they accepted it. And the supervising architect's office of the United States Treasury Department approved the method of treatment.

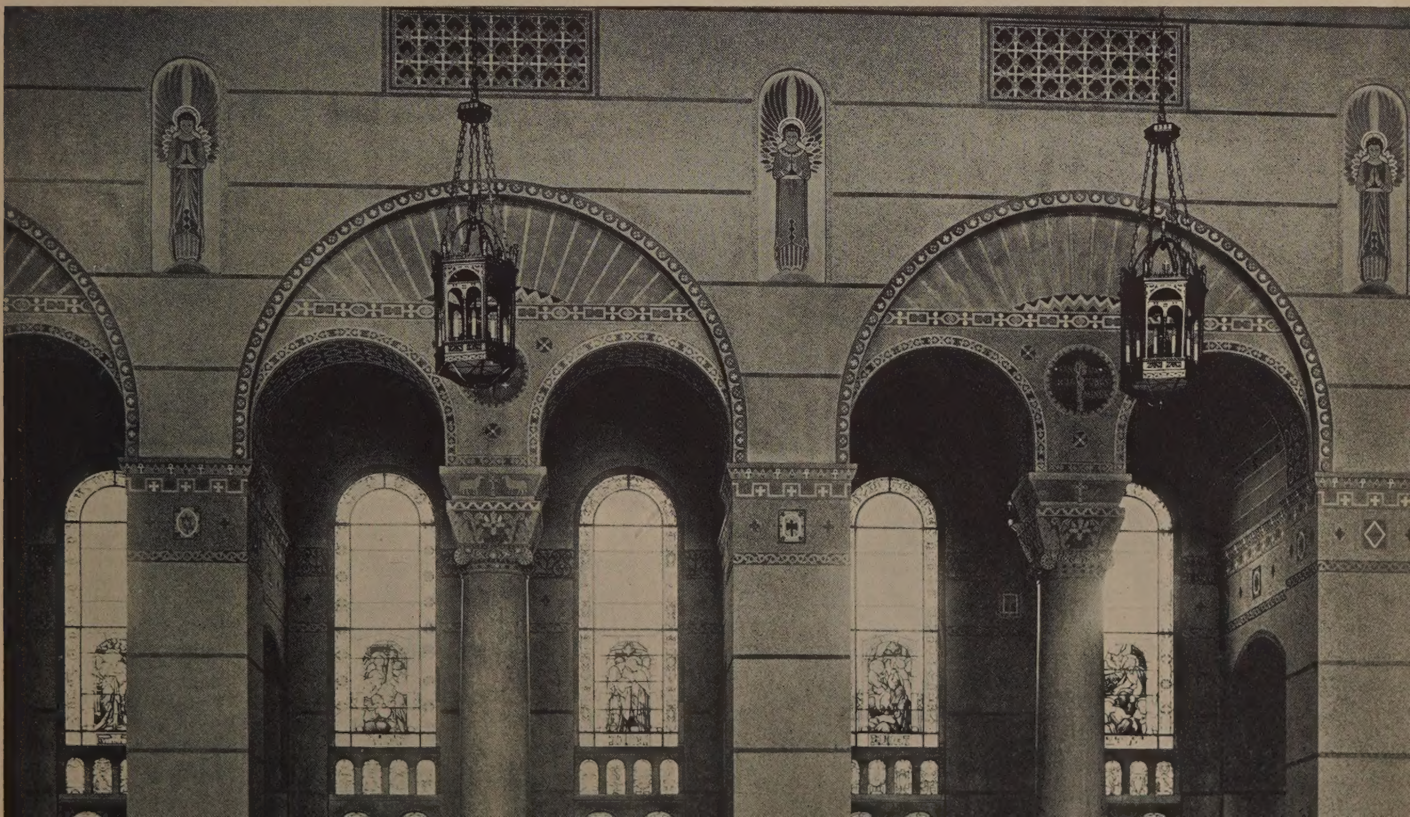
The architects of the building bought this material because they wanted it, because they thought it served their purposes better than any other available material, and because it was in economic balance with other comparable materials.

The problem presented by the architects to our studio was about as follows: The ceilings are to be reinforced concrete, the finish integral with the structure and not applied to previously placed concrete. The designs must be based upon well authenticated Greek forms, but they must be in good taste and finally, they must be of such a general character as not to readily suggest designs that one has seen before. This, it is true, is the maximum of requirements; but architects know very well that it is proper to make such demands when the work is to be executed in certain well known material.

Our development of these designs in the studio was in no way hampered by the fact that we were working with concrete. On the contrary, we experienced the greatest freedom. We established in our preliminary sketches the forms that we thought proper, laid on the colors that we wanted, and when the scheme was finished and approved by the architects, we executed it in concrete without any restriction being imposed by the material.

The architects who used concrete to decorate these ceilings of the Department of Justice did so because they had seen the things which concrete will do. They were satisfied to use it on one of the most important projects in this country. The work is now in place, and it is important to know

Complicated decorative detail in the Shrine of the Sacred Heart, Washington, D. C., was rendered in a great variety of colors through the use of exposed aggregate concrete. Murphy and Olmsted, Architects; John J. Earley, Architectural Sculptor.



what the architects think of it. I am free to say that they are entirely satisfied. The design executed in concrete is all they expected. Concrete is now their material and not solely the material of the structural engineer. They will use it again because they have accepted it as another architectural medium having its own characteristics of color and texture and producing effects not obtainable in other materials.

At the same time that the building for the Department of Justice was being done in our Washington studio, the great dome of the Baha'i Temple at Wilmette, Ill., was being done in our Rosslyn plant. This temple, designed by Louis Bourgeois, was intended by him to be the symbol of a new religion founded in Persia some seventy years ago. Mr. Bourgeois wished to design a temple as new in form and treatment as the religion that it symbolized. He did not wish it to be reminiscent of other styles of architecture associated with other and older faiths.

He designed a nine-sided temple with a perforated dome, as intricate in design and as delicate in execution as a piece of lace. In doing this, he called for the skill of the best craftsmen and for a material of marvelous flexibility. This dome is now completed; why concrete was used and how it was used is a story in itself. Suffice it to say here that the dome was executed beautifully and faithfully with architectural concrete and with economy possible only through the use of a plastic material.

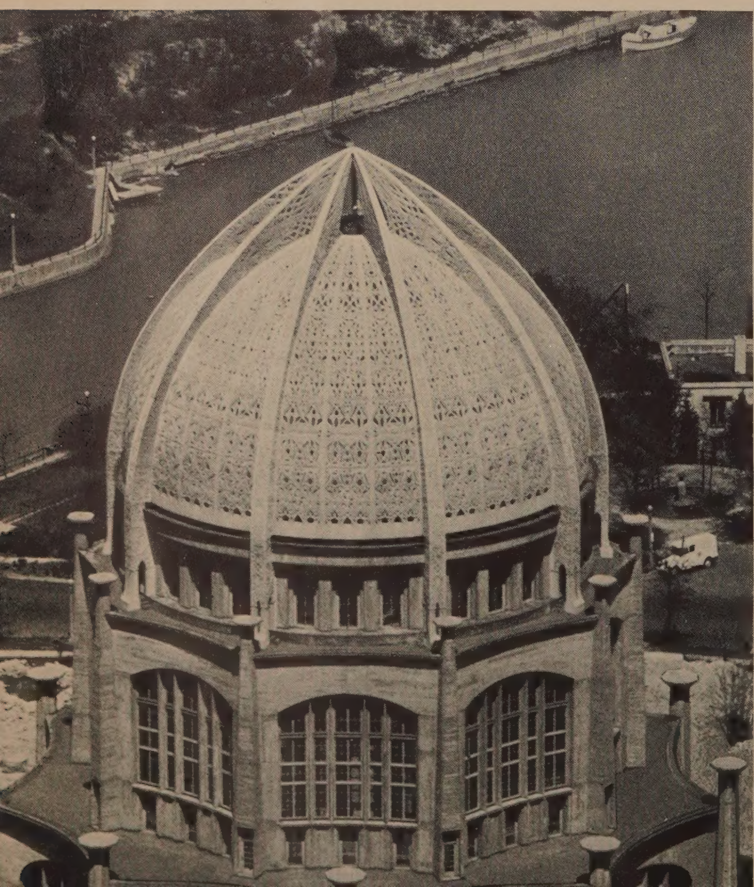
When concrete is rationally and skillfully used, there can be no doubt of its economy. Economy is of the nature of concrete. It is a plastic material and the principle is generally recognized that it takes less force, less work, less money or whatever term you will, to form a plastic than to form a solid material.

A plastic material requires a mold to give it form. This mold or form is the great test of ingenuity of the craftsman in the use of concrete. About a business generation ago, a few engineers designed structural elements which could be duplicated in the same form. This permitted one set of forms to be used for several stories of construction, and it effected an economy that gave a real impetus to the use of concrete in industrial buildings. Now we are in another period, and again the practice of a few shows the way to methods that will in turn become general practice. Further economy in forming has been effected by using plastic materials for the forms themselves and by the still more radical departure of omitting the forms. Let me emphasize the fact that such methods of forming are not just something to be discussed, nor something to be desired, nor something to be expected in the future; on the contrary, they are an accomplished fact.

In the Department of Justice building the *concrete finish comprised the forms in which the structural beams and slabs of the ceiling were placed.* In this way the finish for the structure was the form for the structure and was thereby integrally incorporated in it. Remember, this is not theory, but practice.

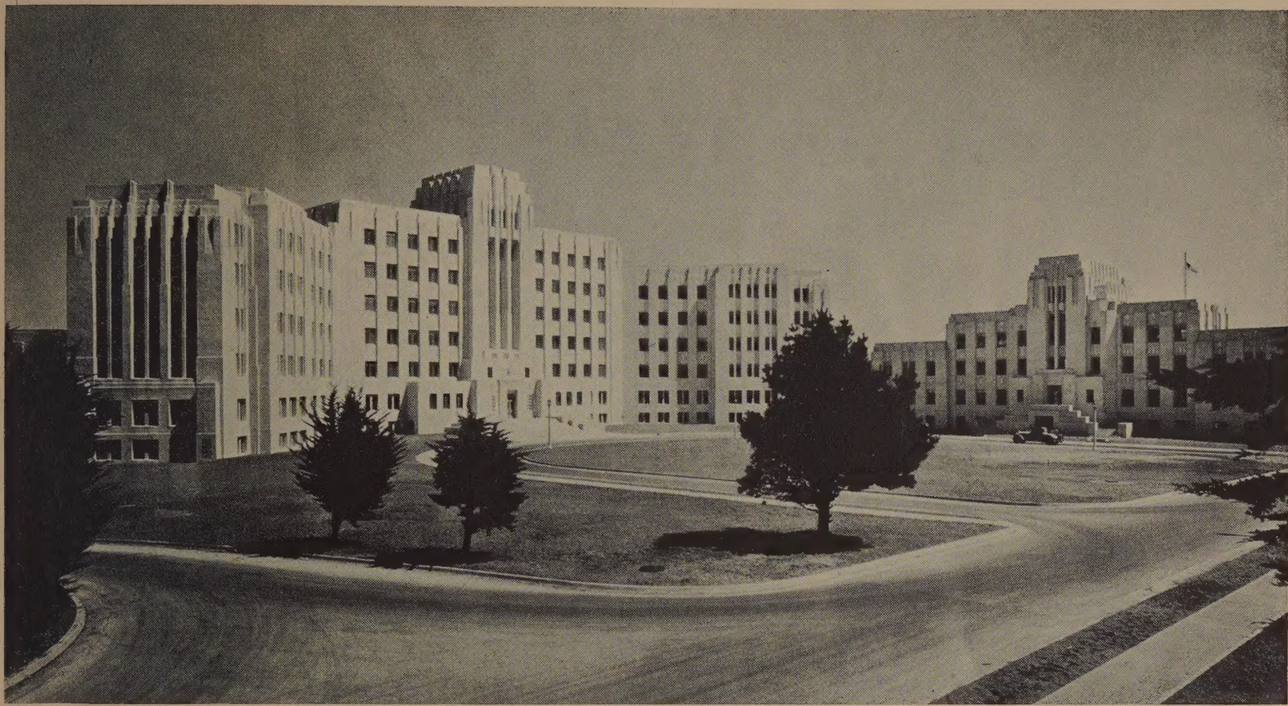
For the dome of the Baha'i Temple, the problem was to build an intricate, lace-like design in concrete. The forming of such a structure with wood or similar materials would have placed on concrete a handicap of cost such as in all probability it would never have been able to carry. The molds of this structure were made of plaster of paris, or calcined gypsum, a plastic material which by proper technique could be made to meet all the requirements of such a complicated design. They were made with economy, with a minimum of labor, and were maintained in such good working condition that all necessary duplication for the construction of the dome was made in one set of forms.

In closing, permit me to state that in presenting this thesis I have been unconscious of any effort to appeal to emotion. I have, on the contrary, endeavored to present simple facts and examples to show that concrete is beautiful, that beautiful concrete is economical and that it is an architectural material. Finally, I have stated that such an architectural material should be in the hands of all architects because with concrete they may bring into reality ideas and dreams that have wanted only the proper medium in which to execute them.



Baha'i Temple, symbol of a new religion, is crowned with a concrete dome as intricate in design, as beautiful as fine lace. Louis Jean Bourgeois, Architect.

Photo © Chicago Aerial Survey Co.



Main group of the Veterans Administration Facility with hospital unit at left and Administration building right. The Facility was formally opened on September 17. Designed by Veterans Administration Construction Service; built by Herbert M. Baruch Corporation, Los Angeles, Calif.

21 Concrete Buildings for West Coast Veterans

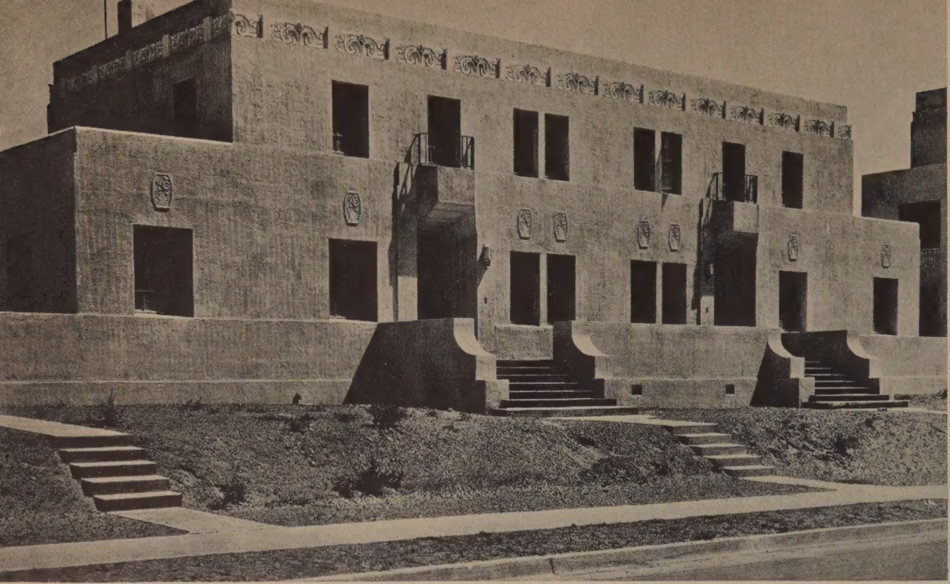
This article is based on an interview with a staff member of the Veterans Administration Construction Service who was intimately connected with the construction of the new Facility at San Francisco.

FORT MILEY hummed with activity last month as the newly combined western department of the Veterans Administration moved in and settled down in its splendidly appointed quarters in the new Facility, which crowns the hill above San Francisco's Lincoln Park. Twenty-one buildings, including a hospital, a diagnostic center, the regional office, officers' quarters, homes for nurses, a recreation center and other auxiliary units comprise this Facility, which realizes the long felt need of gathering the scattered activities of the Administration into one center.

No better setting could have been chosen to reveal the splendor of this group of modern structures than the hill at Fort Miley; and this is indeed fortunate because the beauty and charm of these impressive masses deserve the sweeping view afforded from each of the sloping approaches.

All the units are in modern style, tastefully modified by Mayan feathers and ornament of a flowing nature in the decorative spandrels adorning all but one building. The strictly modern type of architecture as exemplified by highly conventionalized angular ornament was felt unsuitable to a hospital group. An effort was therefore made to relieve the severely conventionalized detail of the usual modernistic design by the introduction of more delicate tracery in the spandrels. By this means any tendency towards stiffness of the design as a whole was overcome.

The decision to use a modern design was not strictly a matter of choice, but rather a compromise with circumstances rising out of structural requirements. There was, in the first place, need for an extraordinarily heavy design for columns because of the necessity for meeting very severe



Nurses' quarters, one of the 21 Facility buildings. Mayan designs on the frieze relieve the severity of the modern lines.

earthquake conditions. The columns were turned out in the exterior walls to save floor space within the rooms and this naturally resulted in a semi-modernistic design. The fact that the buildings were to be set upon a hill, a position suitable for massive lines, further determined the choice of a modernistic scheme that could be worked out with restraint and dignity.

All of the buildings are of monolithic concrete, including exterior walls, parapets, floors and interior cross walls. Rough ship-lap lumber, resawed to give uniform thickness, was used for all wall form construction except for some entrance, tower and parapet details, which required plaster waste molds. The rough wood forms produced a surface suitable for a good mechanical bond for the stucco finish which was applied to all buildings except on the spandrels and frieze.

To insure a uniform plane on which to apply the stucco, slight imperfections in the concrete surface were corrected and the entire surface was sand blasted to secure uniform suction. A 3/16-in. thick color coat of stucco was then applied with a trowel to further avoid any possibility of differences in suction showing through the finished stucco.

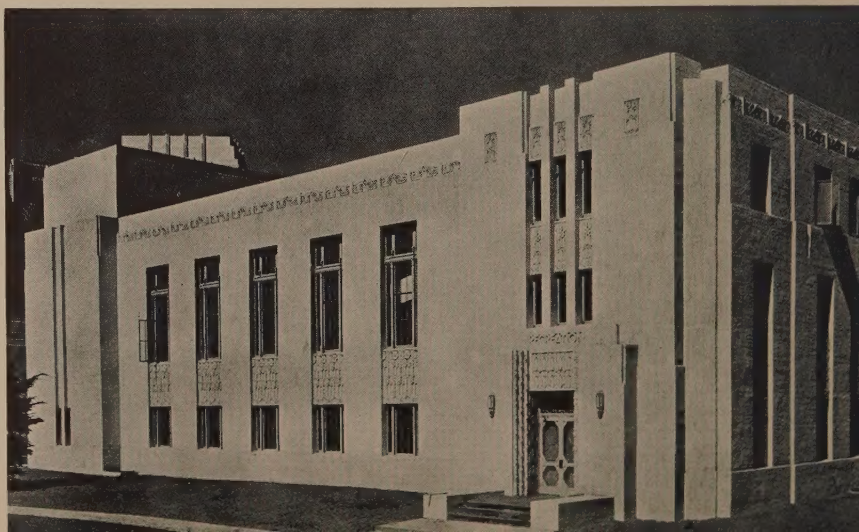
There was a temptation in the selection of color for the ornament to use a high polychrome effect, as such high color combinations are quite common on the West Coast. It was decided, however, that a light cream colored portland cement stucco with light colored ornament would be most conducive to a permanently good appearance.

The finished stucco coat was given a vertical brooming with a whisk broom. The color and slightly roughened surface were selected in the belief that the wall would take on a mellowed effect rather than a splotchy, dirty appearance because of the salt fogs prevalent in the region. Experience in the first few months since the job was finished indicates the surface is mellowing.

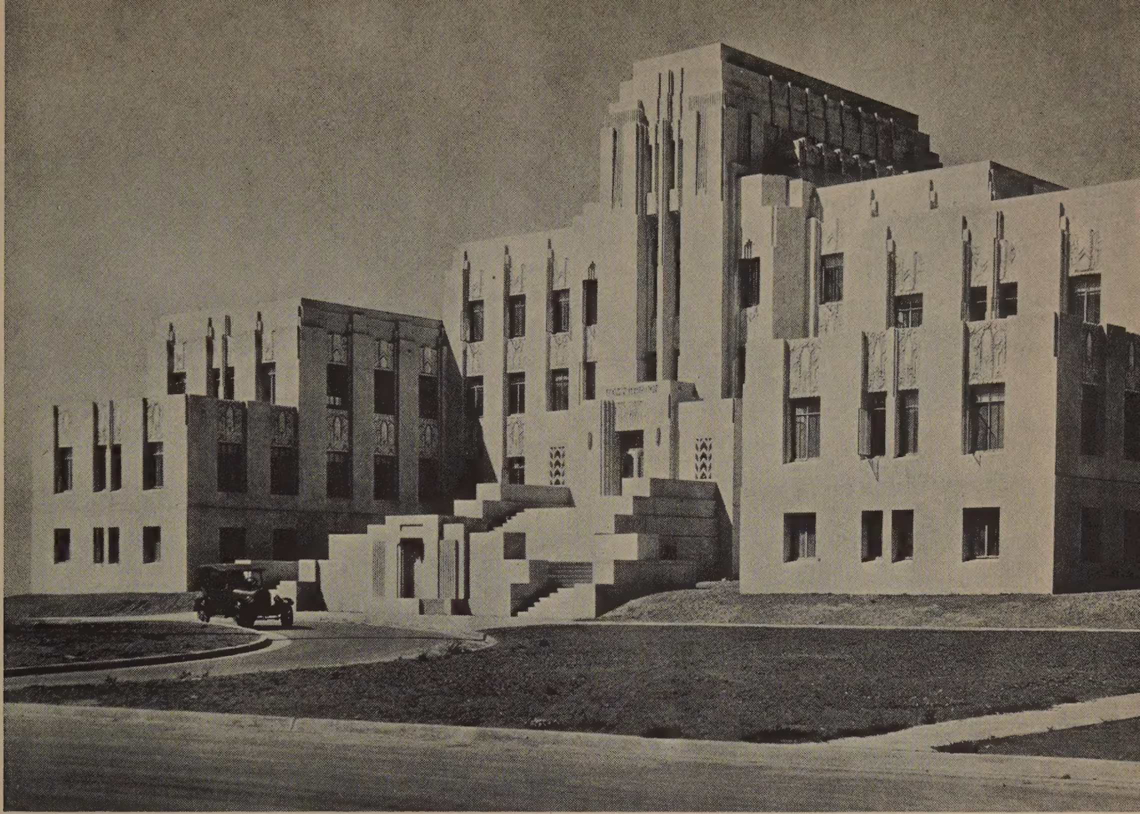
Footings for the main building were in the Franciscan formations, which include pockets of serpentine having fragmented rock content of from 20 to 60 per cent. Some extraordinarily large boulders were scattered throughout the formation. Since some of the footings rested on boulders and others on softer material, main footings were underpinned by a concrete mat to reduce the bearing to an average of 1 1/2 tons per square foot. All footings were thoroughly tied with earthquake struts to prevent displacement and many combination footings were used. Several of the minor buildings in the group are on concrete piling, but because of the tumbled underground conditions it was deemed impractical to use precast piles. The alternative was to drive cores to a suitable bearing and after withdrawing the mandrels, to place concrete under pressure. This method proved quite satisfactory.

The structural design of the buildings, observing the earthquake resistant factor, followed the usual practice of using an acceleration of 1/10 gravity. Due to the "U" shape of the main building, special consideration was given to the indeterminate stresses which might be induced in the shear connections between floors and walls. All earthquake stresses, except in the exterior walls which were designed to take care of themselves, are carried down to the foundations by special frames along the center corridor. These frames

The broomed texture of the stucco finished walls is plainly seen at the right. Recreation center of Facility.



Tower, parapet and entrance details of the Administration building were formed with plaster waste molds.



were designed to prevent the transfer of shear from one exterior wall across the building to the opposite wall. Distribution of stresses was based on the relative stiffness of the walls and frames. It was assumed that the floor system, which in general consisted of 5-in. concrete joists with 2 1/2-in. topping placed with metal pan forms, would transmit the horizontal load to the exterior walls and interior stiffening walls and frames as a rigid diaphragm. After the design was completed it was carefully checked for unequal distribution of forces. As a result, cross walls were added for stiffness at certain points.

The exterior walls have vertical pilasters designed as columns. The spandrels act as beams joining the columns and forming a rigid frame. No part of the wall is dead material but all take stress of some kind. The terra cotta spandrels are solid tile rather than cellular as is usually the case and are anchored with vertical galvanized pencil rods with the backs slushed up solid with special mortar. This anchoring is strong enough to hold but not strong enough to induce shearing stress in the terra cotta, thereby rupturing the spandrels in case of an earthquake.

The excessive fogs at Fort Miley also determined the treatment of the interior faces of the outer walls. They were heavily coated with a damp-proofing of coal tar base. Two-inch furring tile, secured by mechanical anchors, were layed with shoved joints so that there is a complete mortar bond to the walls.

Mechanical vibration combined with hand-spading was used in placing the concrete in the forms, producing a very dense, impervious concrete essential for durability. Test samples were taken for each day's run of concrete, or for every 100 cu. yd., and two cylinders each, one for 7-day and one for 28-day tests, were taken. Grading of the fine and coarse aggregates was checked periodically in order to insure uniformity and compliance with the prescribed mixture.

In round numbers, 27,000 cu. yd. of concrete were used in the construction of the buildings, 1,000 cu. yd. of which went into the footings of the main building. Approximately 1,500 tons of steel were used for reinforcing. No estimate was made comparing the cost of this design with ordinary construction, but it is certain that the cost of the structural portion of the building does not exceed 10 per cent of that normally required where earthquake conditions do not prevail. An excess of more than 10 per cent of concrete was used, but labor costs were reduced because of the large quantities; and because of the size of the walls and columns the average amount of formwork per cubic yard was considerably reduced.

The general contract was let to the Herbert M. Baruch Corporation of Los Angeles on February 3, 1933, at a cost of $898,800. The Facility was completed about August 1, 1934, and formally opened on September 17. The buildings were designed by the Construction Service of the Veterans Administration.

Architectural CONCRETE

ARCHITECT · ENGINEER · CONTRACTOR

IN THIS ISSUE

A. J. BOASE, manager, Structural and Technical Bureau, Portland Cement Association, tells why (page 3) this new magazine and whither . . . JOHN J. EARLEY discusses the history of architectural concrete (page 4) and finds it short but sweet . . . Reticent VETERANS ADMINISTRATION architects would not write, but would tell (page 7) all about the new Facility . . . If YOU CUT the borders carefully off the center four pages you will have some interesting, mayhap valuable, information for your A.I.A. Files . . . TEMPLES FOR THE THREE R'S is our idea about these modern schools (page 15) and what do you think? . . . These FRENCH DESIGNERS are uppity (page 19) in their thinking . . . If you think the CONSTRUCTION INDUSTRY is dead, look (page 20) what some of the fellows are doing hither and yon . . . Modernism has effectively (page 21) crept up on our PUBLIC ARCHITECTS.

ON THE COVER—Los Angeles County General Hospital. Designed by Allied Architects of Los Angeles. The Weymouth Crowell Co., Los Angeles, General Contractors. This is the largest building in the United States with monolithic concrete walls.

Published by

PORTLAND CEMENT ASSOCIATION

33 W. Grand Ave. · Chicago

Notes and Asides

While French government officials are reviewing plans for a 6,560 ft. aerial defense tower (see page 19), certain Paris engineers are understood to be projecting plans for a reinforced concrete office building 2,288 ft. high, reaching this height by means of a series of ten or more setbacks. The fact that French designers are thinking in such enormous heights should silence, for the time being, the death knell for the era of skyscraper construction being sounded in some quarters.

Before these astounding projects are set aside as visionary, it would be well to remember that the French are, above all, a practical people not usually given to flights of fancy that cannot be attained in some degree. Whether or not these projects, as now conceived, will ever reach construction stages, the studies being made will be invaluable contributions to the structural arts and open new vistas for thought and activity for the construction industries and professions.

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Production of the first number of a periodical is always a fearful experiment as well as a charming adventure. While we are almost certain we have done in this inaugural issue what was set forth as its aim, it would be interesting and helpful to know whether anybody else thinks so. Possibly some readers may wish to criticize or offer suggestions; perhaps others desire more specific information on certain subjects or would like to have some special topic discussed at an early date. If so, all communications of this nature will be welcomed.

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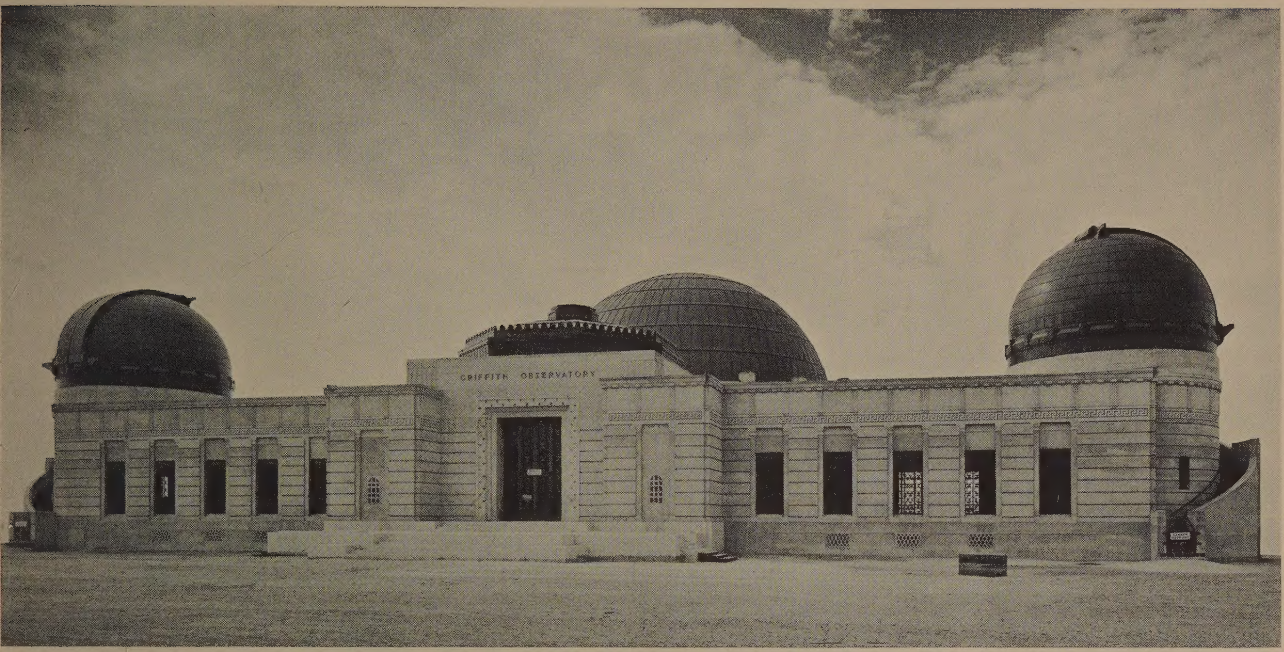
When Gothic meets concrete is there a resounding clash or a peaceful, amenable union? Some sticklers for tradition have anticipated a clash: but the architect of Grace Cathedral at San Francisco thought otherwise. You can judge for yourself with this new church as the evidence. Grace Cathedral will be featured in the next issue of ARCHITECTURAL CONCRETE with illustrations and notes on its construction and detail.



GRIFFITH OBSERVATORY, LOS ANGELES, CALIFORNIA

John C. Austin and Frederic M. Ashley, Architects

William Simpson Construction Co., Contractors

THE Griffith Observatory and Planetarium, Los Angeles, Calif., is located on the summit of a hill in Griffith Park. The construction consists of monolithic concrete walls, floors and roof, including the planetarium dome with a skeleton steel frame. The whole was designed as a rigid structure to resist earthquake shocks.

Concrete is the architectural medium, and the monolithic concrete walls serve an important structural purpose, contributing greatly to the rigidity of the building. Because the concrete serves this dual purpose, special attention was given to grading of the aggregates and proportioning the mix to insure a uniformly high quality. The water content was carefully controlled to give a mixture of proper consistency that would not segregate and to produce a surface of uniform density and color.

Concrete was conveyed to the forms in buggies. As a further precaution against segregation where the concrete was placed in deep forms, a canvas "elephant trunk" was used. This served also to prevent accumulations of hardened concrete on the forms above the general level of the concrete, which would mar the appearance of the surface. The concrete was compacted by puddling and by using internal mechanical vibration and by rapping the forms. Construction joints were located along the lines of rustication to make them invisible on the surface of the completed wall.

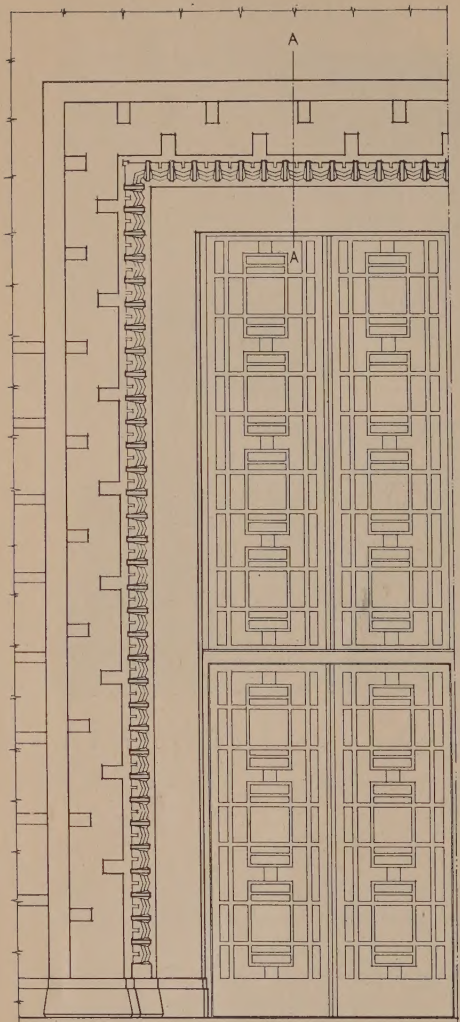
A smooth finished surface was desired, so all forms were lined with plywood or Presdwood wherever the surface was to be visible. The form lining was secured to the form sheathing with small nails having thin flat heads that do not leave an impression in the finished concrete. Two by four-in. and 2 by 6-in. lumber was used for framing the forms, which were all sheathed with 1-in. T and G boards.

The ornament throughout is relatively simple, but because of the depth of rustication and the deep cut key design in the decorative band beneath the parapet, special care in form construction was required to insure sharp, clear lines. In order to strip the forms without injuring the edges of the rustication and the narrow bands which make up the key pattern, beveled strips having a longitudinal saw cut were lightly tacked to the forms. When the forms were removed, the strips pulled loose from the main body of the forms and remained in the concrete to be removed later. The saw cut permitted the strip to be compressed sufficiently so it could be removed readily.

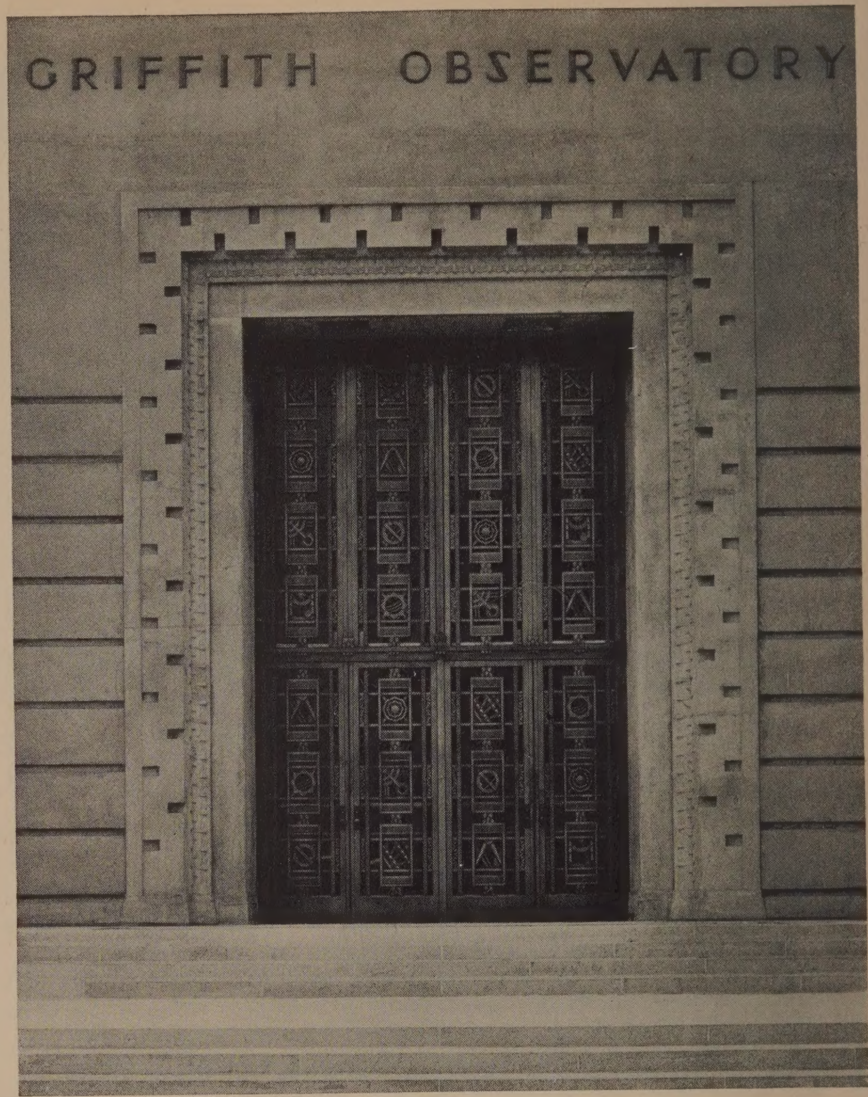
The more intricate detail on the jambs around the main entrance and along the coping was formed with a combination of plaster waste molds and lined wood forms. The cost of decoration was minimized by considerable repetition.

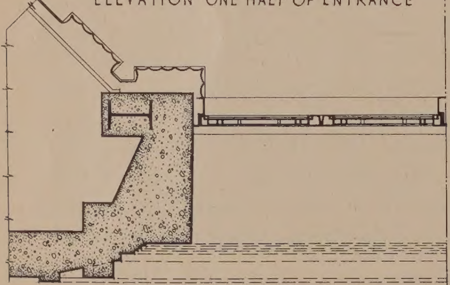
(To facilitate stripping, plaster waste molds should be shellacked and thoroughly greased with a light cup grease. If the molds are not first shellacked the absorption of moisture from the concrete results in a lighter color than the surrounding concrete which might be undesirable.)

Ventilating ducts back of the parapet presented an interesting problem in form construction because of the shape of the opening for the metal louver and the projecting lips. Chamfered corners on all projections, while requiring numerous small pieces in the forms, insured easy stripping and unbroken exposed edges.



ELEVATION-ONE HALF OF ENTRANCE

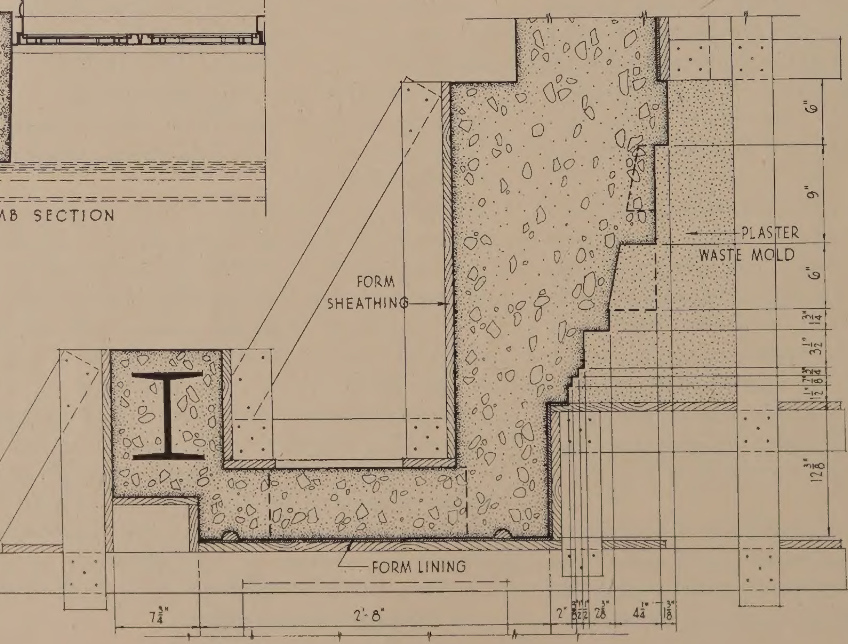




JAMB SECTION

MAIN ENTRANCE DETAIL
HALF ELEVATION AND JAMB SECTION

WOOD FORMS AND PLASTER WASTE MOLD FOR HEAD AND JAMB



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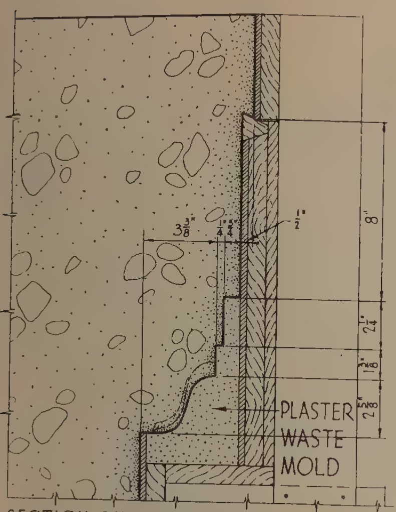

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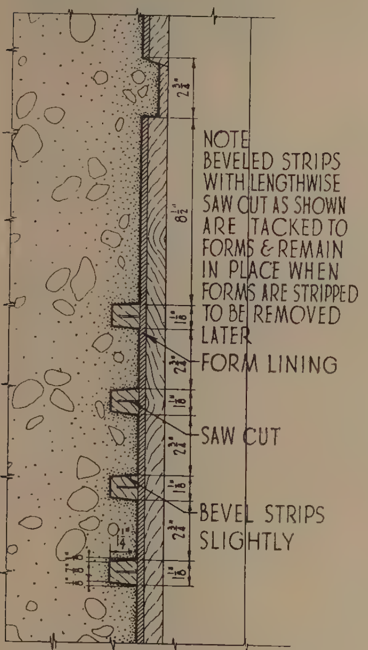

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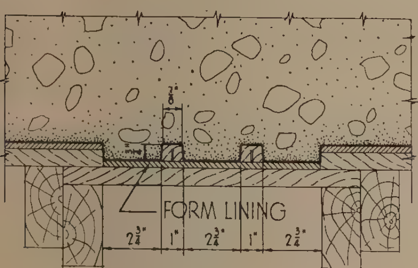

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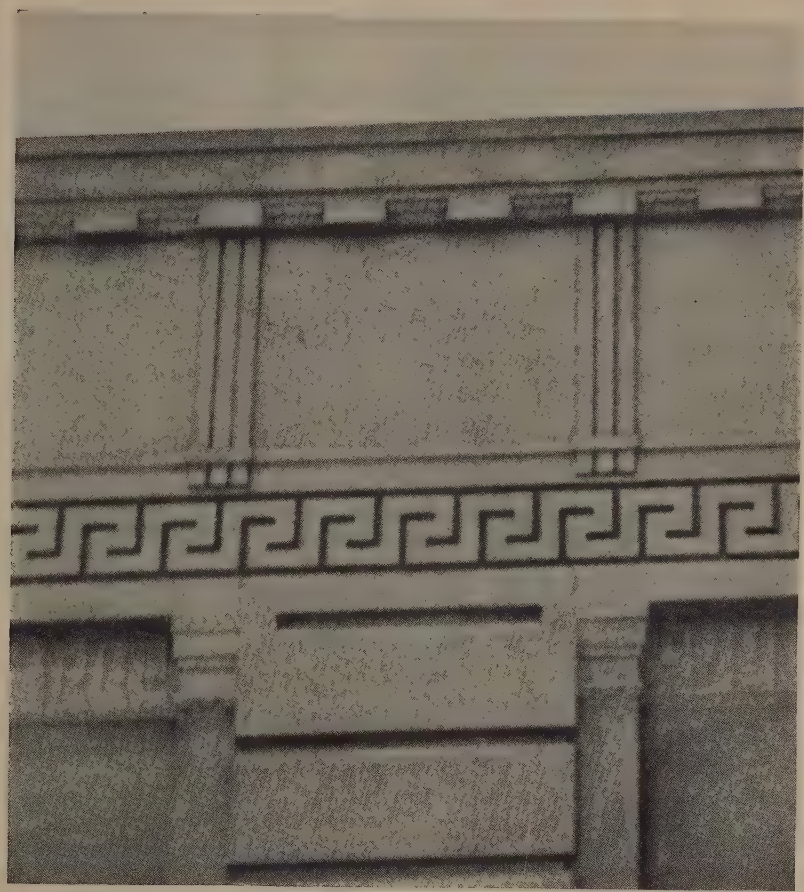
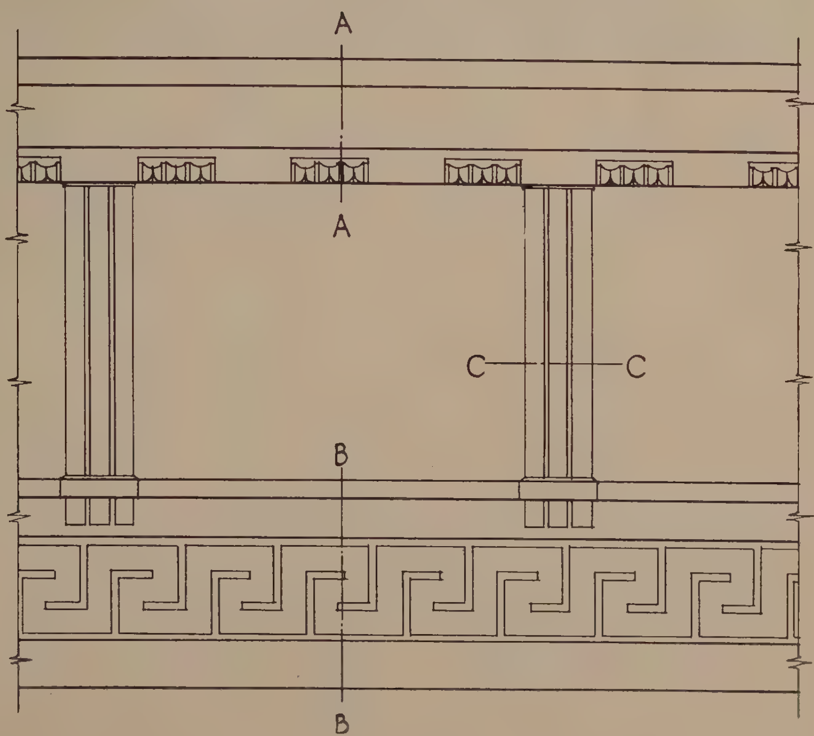
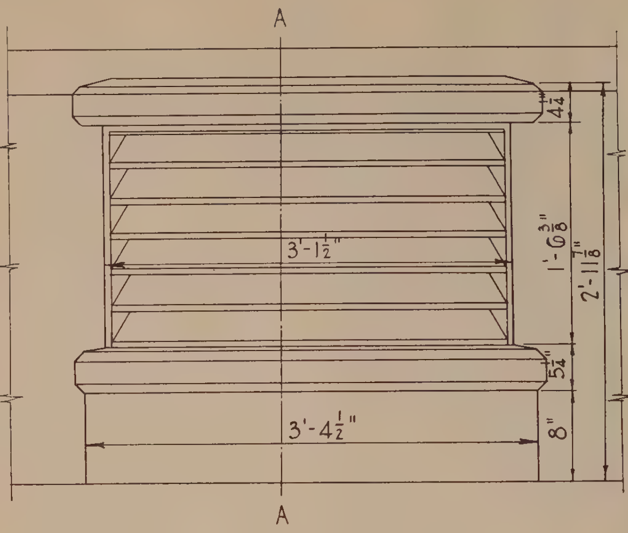
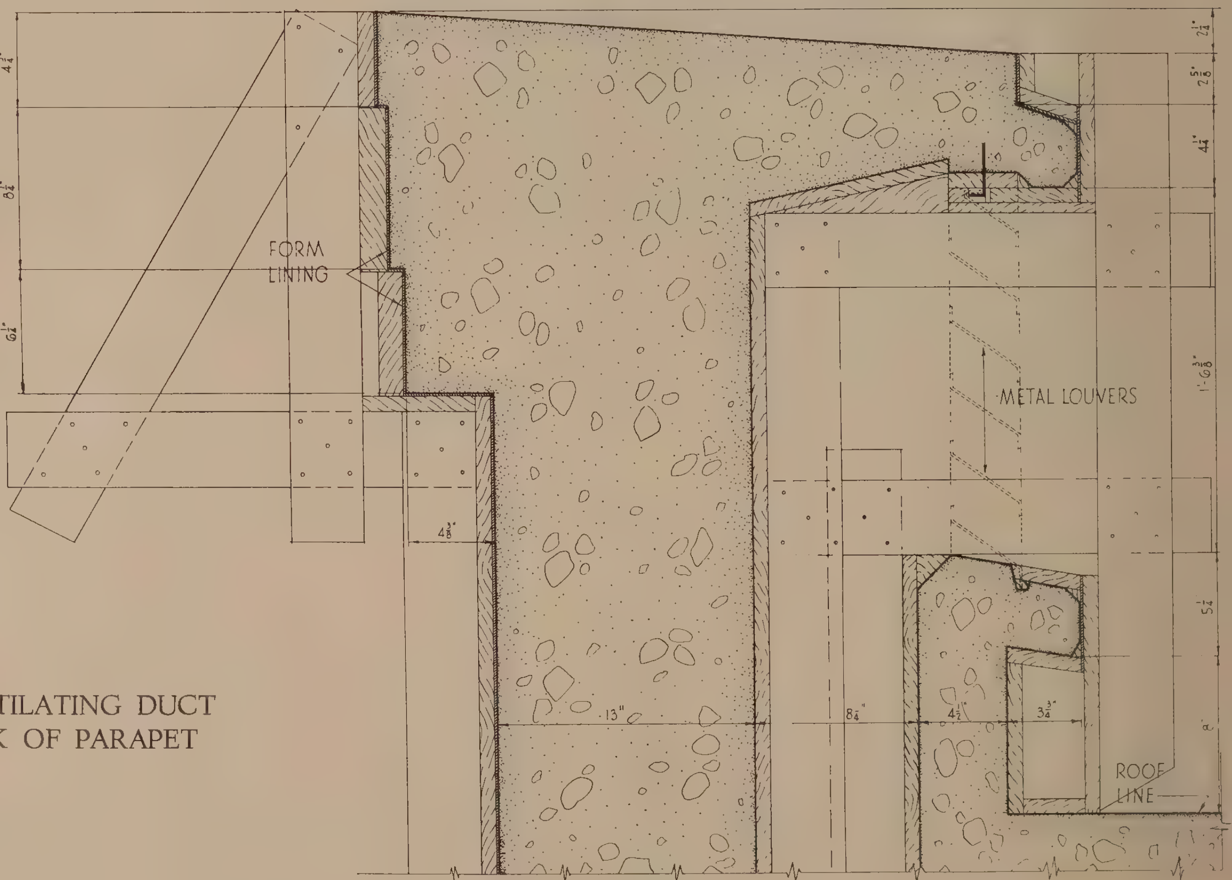




CONTINUOUS DECORATIVE BAND ON PARAPET AND TOWERS





SECTION ON LINE A-A

VENTILATING DUCT
BACK OF PARAPET

Hawthorne School, Beverly Hills, Calif.—The exposed concrete finish, revealing marks of the rough lumber used for forming, is coated with a white cement paint.

New Temples for the Three R's

A portfolio of modern school buildings from Alaska to the Gulf . . . . . .

IF SCHOOLS are, as it is often said, the greatest single factor in the development of fine, healthy citizens, the designing and construction of school buildings are among the noblest of occupations. For the school building has become increasingly important in the conduct of modern education.

It is there, that the nation's youth spends the days of the most formative period of life; that myths and fancies gradually become facts; that ambitions are suggested and encouraged; that ideals, habits and tastes are formed. If the ideal of education is to teach truth, health and beauty, then the place wherein these delicate processes are carried forward must itself suggest an atmosphere of health and cleanliness, safety and efficiency, and beauty.

The little red school house, which harbored most of our elders and some of us, was a splendid institution. Its importance in the growth of the nation can never be depreciated. What it produced in manhood and womanhood is its own defense. But, except in isolated localities, it has no place in the complex world of today.

When the little red school house was enlarged to care for hundreds instead of a score of students, it became bleak and dark, austere, and often hazardous to the lives of those it was built to protect. For a long period we built school houses common and ugly, ill-planned and uninviting, usually poorly lighted, warm enough but never properly ventilated, sturdy in appearance but never secure against the menace of fire or storm or earthquake. At the same time we built more beautiful churches, more charming and comfortable homes. For some strange reason the end of life was given more thoughtful consideration than its beginning.

Now, as fast as it is financially possible, these conditions are changing. Architects are allowed wide scope in designing school buildings to be the most beautiful structures in the community. Interior arrangements are studied and perfected, providing wide halls and ample class rooms. Even

Beauty and charm not often associated with school yards rule this inner court of the Hawthorne School, Beverly Hills, Calif. Green and flowering plants in individual jardinieres relieve any suggestion of austerity and form delicate tracery against the gleaming white walls.

Ralph C. Flewelling, Architect, Los Angeles

J. S. Metzger & Sons, Contractors, Los Angeles

Union High School, Huntington Beach, Calif. —Main entrance detail of building shown on page 18. This intricate ornament was cast in place through the use of plaster molds. The walls were finished with a gray-white even textured stucco.

Allison & Allison, Architects, Los Angeles

John Simpson Co., Contractors, Los Angeles

small schools have gymnasiums and acoustically good auditoriums. Proper lighting and ventilation are today as important as reading, writing and arithmetic.

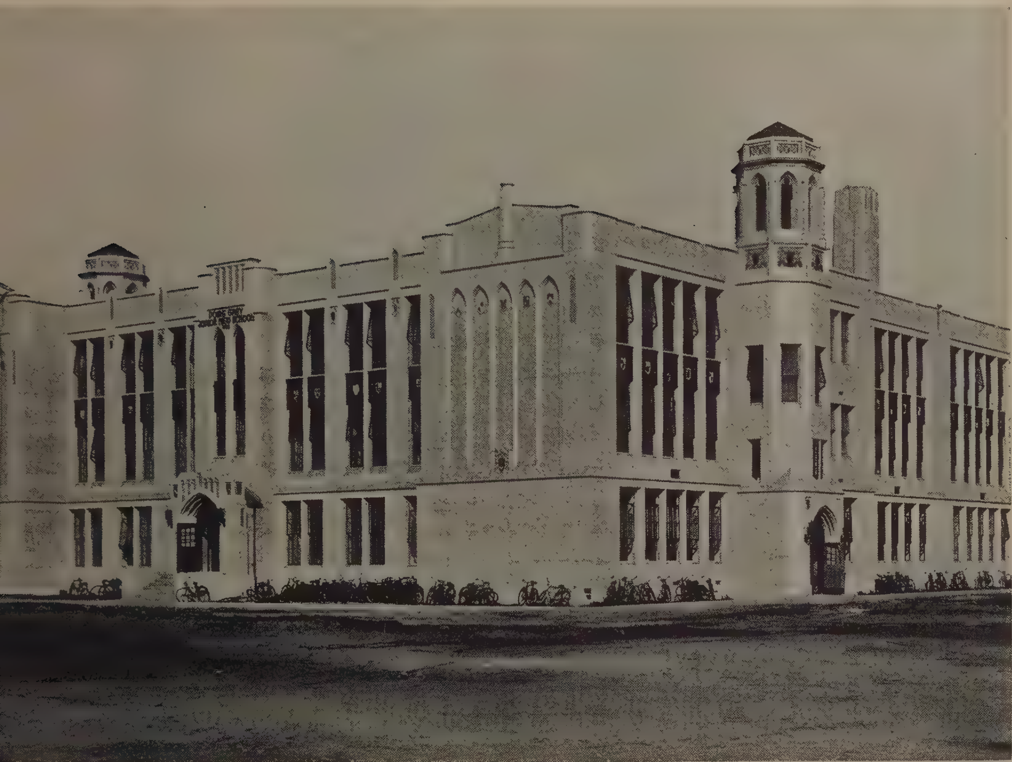
Safety and protection from fires, tornadoes and earthquakes are demanded for modern schools. And strangely enough, it has been discovered that firesafe, permanent structures are more economical, more saving of the public money than tinder-box and firetrap construction. The dubious saving made through the substitution of inflammable, unstable construction can be wiped out and replaced by terrific deficit when fire, storms and earth tremors strike.

The importance of strength and protection as well as beauty in school buildings was demonstrated clearly during the earthquake in California last year. There, where many

Public Schools Building, Fairbanks, Alaska.—As in the newly completed Fairbanks Federal Building, monolithic concrete was used in this school. It was started early in 1933, and by the time snow fell was built, glazed and ready for interior decoration.

Tourtelotte & Hummel, Architects, Portland, Ore.

Wm. McDonald Construction Co., St. Louis



Point Grey Junior High School, Vancouver, B. C. —Six-in. boards of ordinary lumber were used for contact surfaces in forming the monolithic walls of this large Canadian school, achieving uniform marking throughout. The exterior was then treated with colored cement paint.

Townely & Matheson, Architects, Vancouver

Dominion Construction Co., Vancouver

modern schools are constructed of monolithic concrete, other less sturdy buildings cracked and tumbled while the strongly built schools suffered little or no damage. Fortunately, the earthquake occurred after school hours. The necessity for earthquake as well as fire resistance in school construction was vividly shown, and many believe shock-proof construction is required elsewhere than on the West Coast.

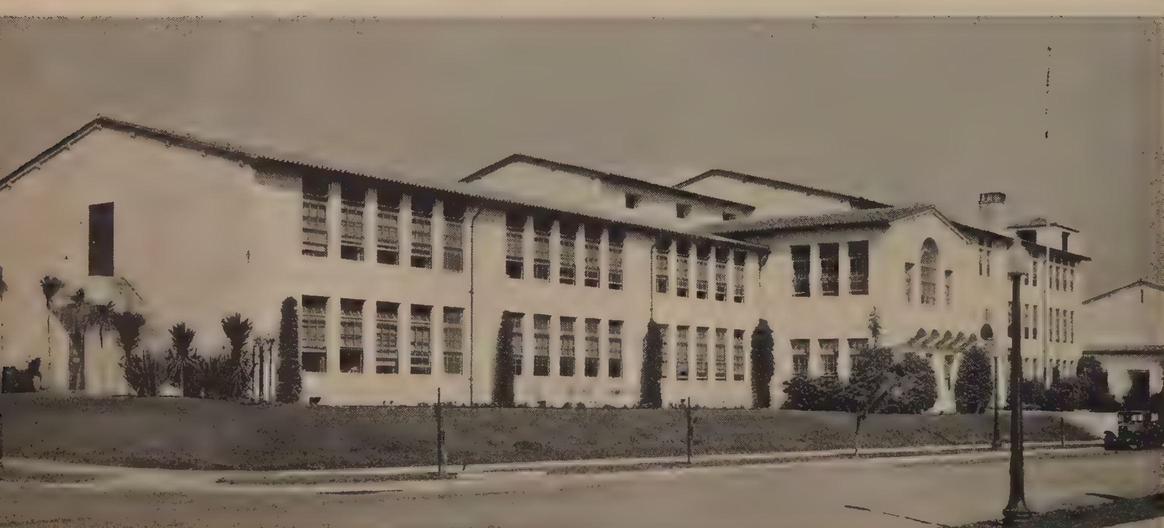
School construction will be an important activity for many years to come. As populations grow, facilities must be enlarged, obsolete buildings replaced. In all cases in enlightened communities, the new ideals of education and health will govern these works. It is here where beauty and strength in architectural vision and engineering cunning will always find full opportunity for expression.

School architecture in California is distinguished, generally, by its wide departure from the ordinary. Beauty, without sacrificing utility, rather than drabness seems to have been the aim successfully achieved in Union High School, Huntington Beach.

Robert E. Lee School, Dallas, Texas.—Unlike most of the schools illustrated here, the concrete surface of this building was not treated with paint or stucco, but left as it came from the forms.

DeWitt & Washburn, Architects, Dallas

Eckert Burton Construction Co., Dallas



Horace Mann School, Los Angeles.—With a limited area to build on, this structure takes advantage of every inch, achieving the appearance of spacious surroundings by elevation from a sloping terrace.

Edelman and Zimmerman, Associated Architects, Los Angeles

Clarence P. Day Corporation, Contractors, Pasadena

Plan 6,560-Foot Tower for Paris Air Defense

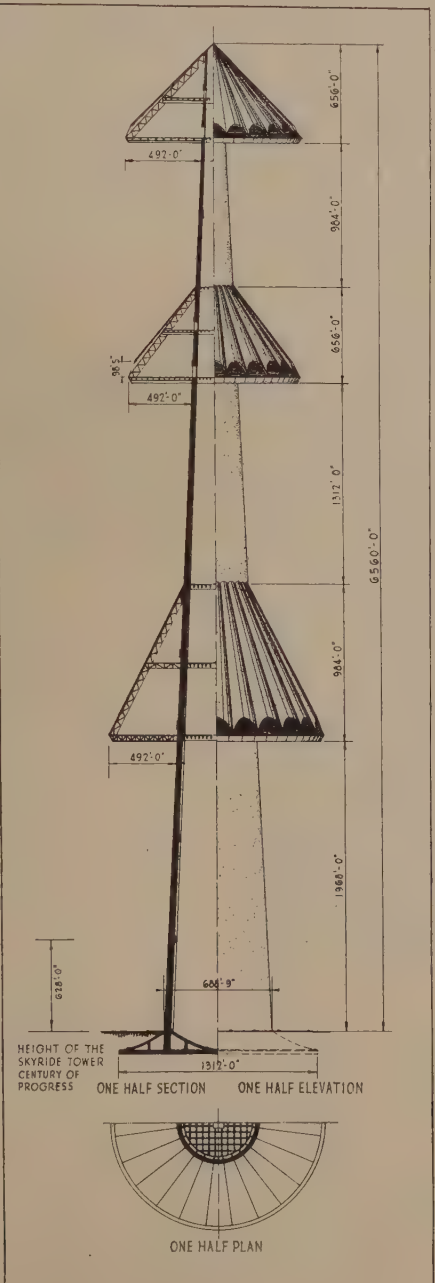
Built to house cloud-high airports and heavy artillery batteries, it would outreach the Empire State Building 6 times, the Eiffel Tower 7½ times.

FRENCH government officials are at present examining plans and proposals for the erection of a 6,560-ft. reinforced concrete tower as part of the air defenses of Paris.

An article in *Le Genie Civil* describes a design by M. Henry Lossier and M. Faure-Dejarric for a tower 6,560 ft. high with covered platforms at 1,968 ft., 4,264 ft., and 6,000 ft. above the ground level which would be above the danger zone in gas attacks and could be used as runways for defending airplanes and as platforms for artillery. In this way, defending planes would start from a level approximately the same as that of attacking bombers, and the 100 4-in. guns on each platform would have a similar advantage in height. Elevators would be provided inside the tower, and anti-aircraft guns, searchlights and other defense equipment would be fitted on the platforms.

The site suggested for the tower is at Issy-les-Moulineaux, on the south of Paris. Proponents of the plan are urging the construction of the tower in time for the 1937 Exposition.

If the figure 6,560 ft. fails to impress, it should be recalled that a tower of this height would be about six times as tall as the Empire State Building and about seven and one-half times the height of the Eiffel Tower. Visitors to the Century of Progress could imagine ten Skyride towers stacked on top of one another,



and the peak would be just short of the proposed Paris tower.

Exterior diameter of the shaft of the tower in M. Lossier's design is 689 ft. at ground level and 130 ft. at the top. At the bottom the thickness is 39 ft.; this decreases toward the top, the shell being designed for uniform stress. Wall foundations are conical and 656 ft. wide, the two cones meeting at the center of the circular foundation and forming a slab with an overall diameter of 1,312 ft. Each horizontal platform overhangs the tower shell by 492 ft. and is covered by a sloping roof forming a truncated cone around the tower. At the lower platform the truncated cone has a height of 984 ft.; at the two other platforms the height is 656 ft. In the sloping roof, openings 100 ft. high and 165 ft. wide are made for departing airplanes.

Calculations have been made with a wind pressure varying from 50 lb. per square foot at ground level to 100 lb. per square foot at the summit. A reduction of one-third was allowed to take account of the circular cross-section. The maximum shearing stress was 94,000 tons and the bending moment 297,000,000 foot tons. Calculated overturning moment due to recoil of the guns is only 6 per cent of that due to the wind.

To erect the tower, it is stated that moving steel forms would be used and the concrete vibrated.

CONTRACT was recently awarded to Warren Bros. Co., Cambridge, Mass., for construction of the Bellamy River Bridge between Dover Point and Cedar Point, Dover, N. H. Plans were prepared by Fay, Spofford and Thorndike, consulting engineers, Boston, for the New Hampshire Toll Bridge Commission. The structure consists of concrete pile bent trestle, 660 ft. in length with a central bascule draw span of 60 ft. The trestle will provide a 20-ft. roadway and one 4-ft. sidewalk. Overall width is 32 ft. 2 in.

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Albert W. Lewis, Samuel Oxhandler and John D. Q. Churchill, associated architects, have completed plans for the Bronx Terminal Market. The contract was let to the Turner Construction Co., which started work following official ground-breaking ceremonies attended by Mayor La Guardia and William Fellowes Morgan, Commissioner of Public Markets, Weights and Measures, New York City. The market will comprise 48 stores, 55 ft. wide and 1980 ft. in total length. All footings, floors, roofs and exterior walls are of reinforced concrete; partitions between stores are cinder block masonry. Several coats of cement paint will complete exterior finish.

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WHITE CONSTRUCTION CO., INC., New York City, awarded contract by the Planetarium Authority of the American Museum of Natural History for the construction of the two-story and basement Hayden Planetarium, has the work well advanced. This structure, for which plans were prepared by Trowbridge & Livingston, architects, with Weiskopf & Pickworth, structural engineers, all of New York, and Roberts & Schaefer Company, Chicago, engineering consultants, has a shell dome roof of reinforced concrete designed according to the Zeiss-Dywidag system.

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The Reading School Board, Reading, Pa., has awarded the general contract for the construction of the new Northwest Junior High School to McCloskey & Co., of Philadelphia, at a cost of $788,000. The building was designed by the Associated Architects of Reading: Richter & Eiler; W. Marshall Hughes; Muhlenberg Bros.; Muhlenberg, Yerkes and Muhlenberg; Scholl & Richardson, and Alexander F. Smith. Financed by PWA, this 41-room school will be reinforced concrete throughout, with cinder block back-up and partitions; two stories in height, 110 ft. by 100 ft. in plan, with 210 ft. by 65 ft. wing.

• •

W. T. GRANGE CONSTRUCTION CO., Pittsburgh, has been awarded a contract for the construction of three monolithic concrete research buildings now being constructed at Harmarville, Pa., for the Gulf Refining Co. Floors and walls will be Haydite concrete.

Architectural work is under the direction of W. H. Kirchenbower of Pittsburgh, and structural design by Fritz Kublitz assisted by Gulf Company engineers. The buildings are as follows: Two buildings, 163 ft. by 52 ft., three stories high; one building monitor type, 271 ft. by 82 ft., one story and monitor. Concrete work has been sublet to E. E. Olsen and Co., Washington, D. C.

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William J. Chase, Atlanta architect, has let contracts for two monolithic concrete municipal buildings. The Carrolton Jail at Carrolton, Ga., was let to Honneycutt Construction Co., and will cost $75,000. First story forms were stripped recently. The Gainesville, Ga., police station and jail was let to A. K. Adams Construction Co. Cost, $150,000.

• •

The Frederick Snare Corporation of Providence, R. I., has started work on the substructure of the new Ashton Viaduct, a five-span, reinforced concrete open spandrel arch bridge. This part of the contract was let separately at a cost of $131,000. Planned by D. O. Cargill, bridge engineer of Rhode Island, the structure is to have a width of 54 ft., a total length of 926 ft. and a central span of 160 ft. with two end spans of 125 ft. each on either side.

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THE State Roads Commission of Maryland has awarded a contract to the George A. Fuller Co., Inc., of Washington, D. C., for the construction of the Orleans Street Viaduct in Baltimore. This structure is 2,075 ft. in length, 54-ft. clear roadway, and two 6-ft. sidewalks. Footings, piers, abutments and substructures will be of concrete. Superstructure will be steel encased in concrete with reinforced concrete slab floor. Structure was planned by B. L. Crozier, chief engineer, city of Baltimore. PWA financed, it will cost about $849,400.

[redacted]

out, it was designed by Office of Public Buildings and Public Parks of National Capital; Lockwood Greene Engineers, Inc., consultants.

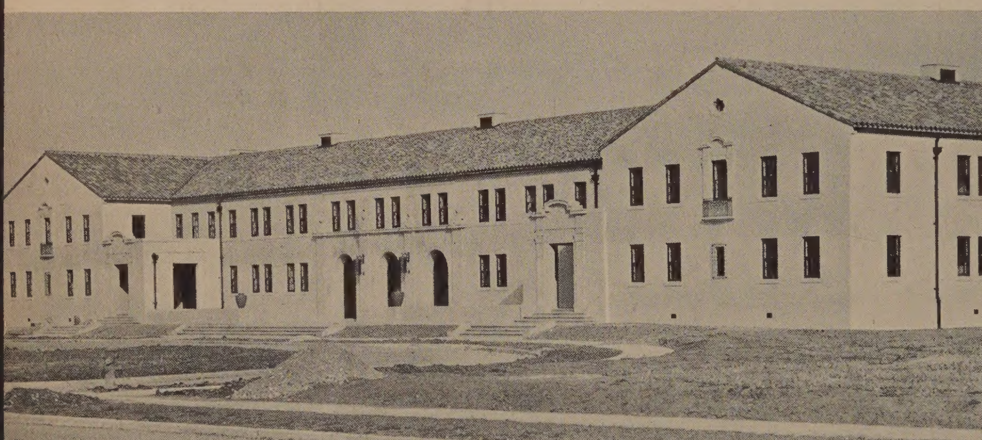
Federal Architecture Goes MODERN

PROBABLY no groups of architects and engineers are called upon to design such a wide variety of kinds and styles of structures as those who form the designing staffs of the various Federal government departments. This versatility, however, is not so much a matter of choice as of circumstance, for government construction ranges from immense office buildings, hospitals, courthouses and other monumental structures to barracks, prisons, barns, laboratories and small postoffices. These functional differences are given further variation by the architectural tastes and demands of the farflung regions of the nation and its territories where the government builds.

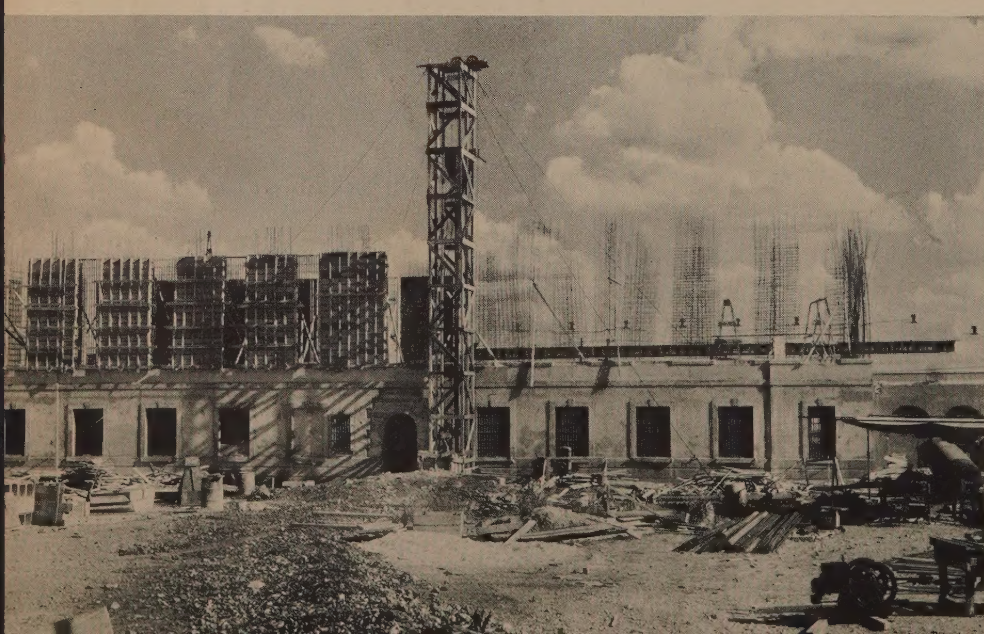
It is reasonable, therefore, that Federal construction throughout the comparatively short history of the nation has kept pace with changing trends instead of clinging stanchly to some traditional form of architecture. Federal architects have been largely responsible for restoring and preserving Colonial structures along the eastern seaboard. They have also, in times of stress when public works formed the chief construction activity, carried on the development of contemporary styles.

At present there is a very definite trend toward the "modern" style in Federal construction, particularly in the

Treasury Department architects and erected by Wm. McDonald Construction Co., St. Louis. Concrete work was done by Warrack Construction Co., Seattle.



Bachelor Officers' Quarters, Sunnyvale Air Base, Calif., designed by Navy Department and built by Robert E. McKee, San Francisco. Exterior walls are stucco over monolithic concrete.



Post Prison, Fort Sam Houston, Texas, now under construction in monolithic concrete. This modern building was designed by the Construction Quartermaster at the post. Gilbert Falbo, San Antonio, contractor.

execution of large structures. These are not confined to one locality but, starting with the home office in Washington, spread to the middlewest, Alaska, the Pacific coast and Gulf states. Recent examples of buildings done in the modern manner show fine restraint in adaptation of these new forms.

In many cases recently, the development of modern styles by Federal architects has resulted in wide use of reinforced concrete. From a basic structural material in older Federal buildings, concrete has emerged as a medium to express line, mass and decoration in the new. The economy of a material in which structure and ornamentation are integral is naturally attractive.

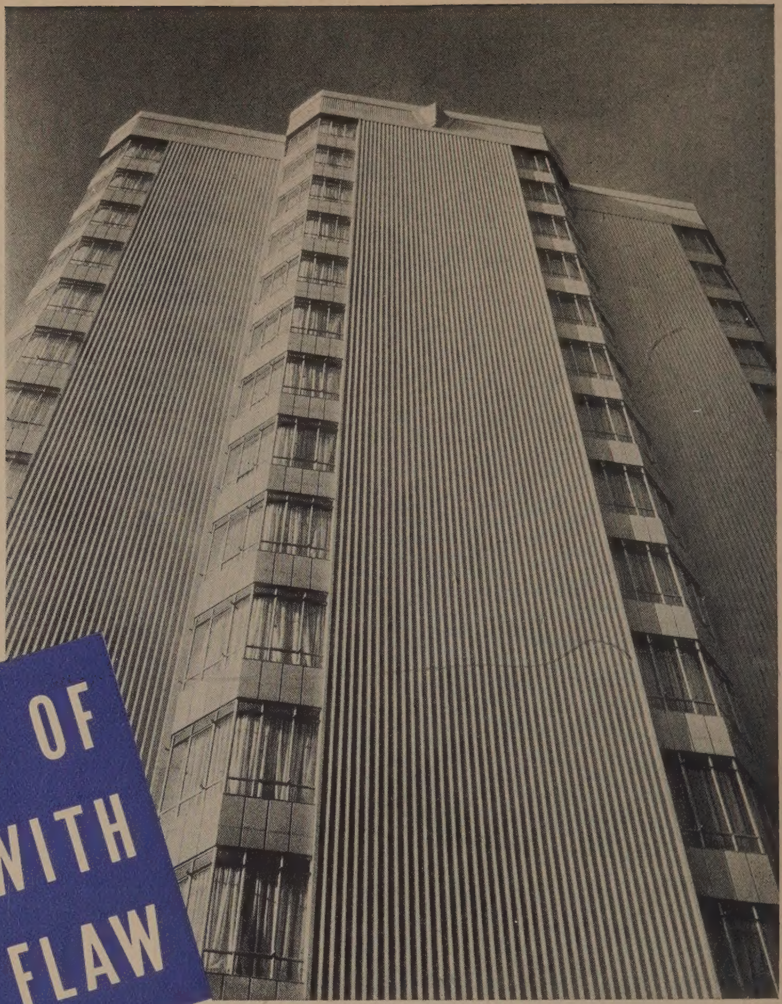
Now under construction with reinforced monolithic concrete are several notable projects: An Annex to the large warehouse in Washington, D. C.; a post prison in Fort Sam Houston; several buildings at Hamilton Air Field in addition to the many now in use; and a Milk Products Laboratory at Beltsville, Md. The Bureau of Dairy Industry plant at Beltsville now comprises several barns, laboratories and cottages all of concrete.

Recently completed were the Federal Building at Fairbanks, Alaska, opened early in 1934, and the Fort Miley Veterans' Administration Facility at San Francisco. Both of these structures, as may be noted in the accompanying illustrations, are fine examples of modern design.

California's longest open spandrel arch bridge is part of that state's new coastwise motor highway. The arch span is 330 ft. long. Nine 40-ft. girder spans approach the 12-ft. wide piers at either end of the arch span making the total length of the bridge 714 ft. Timber falsework 240 ft. above creek bed supported the forms for placing the concrete of this graceful bridge.

BIXBY CREEK BRIDGE
Designed by
California Division of Highways,
C. H. Purcell, State Highway Engineer
F. W. Panhorst, Acting Bridge Engineer
Built by
Ward Engineering Co., San Francisco

Tower of the monolithic concrete Edmond Meany Hotel, Seattle, Wash. R. C. Reamer, architect. Teufel and Carlson, contractors.



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